

NEW TEXTULARIIDÆ AND OTHER ARENACEOUS FORAMINIFERA FROM THE PHILIPPINE ISLANDS AND CONTIGUOUS WATERS.

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The species of foraminifera described and figured here belong to the Textulariidae with the exception of three species of other arenaceous foraminifera belonging to the Astrorhizidae and Lituolidae. All are from the dredgings of the United States Fisheries steamer *Albatross* about the Philippine Islands and in contiguous waters, the material from which has kindly been placed in my hands by the Bureau of Fisheries for the description of the Foraminifera. All of the species here described belong to known genera but all are apparently undescribed. Some of these are of very large size for this group.

TEXTULARIA VERTEBRALIS, new species.

Plate 78, fig. 1.

Description.—Test elongate and tapering, chambers very numerous, in the adult portion rounded in cross section, the distal portion of the chambers convex, the proximal portion concave behind the middle, chambers gradually increasing in size, wall composed of agglutinated sand, usually fine, and smoothly finished; aperture at the base of the inner margin of the chamber; color gray.

Length up to 6 mm.

Type-specimen.—Cat. No. 8501, U.S.N.M., from *Albatross* station D5512, off northern Mindanao, 445 fathoms.

This species is a very characteristic one, resembling a series of vertebræ, the chambers in adult specimens very numerous, as many as 60 having been counted in some of the specimens. It is also one of the largest species of the genus.

TEXTULARIA IMMENSA, new species.

Plate 79, fig. 2.

Description.—Test large and broad, rhomboid, very much flattened, chambers low and long; wall thick, of rather coarse angular sand grains imbedded in an unusually large amount of light gray

cement; aperture consisting of a series of small openings running from the inner margin of the apertural face to the highest point at the distal end of the test, about 20 in number; color gray.

Length up to 6 mm., breadth up to 4 mm., thickness 0.5 mm.

Type-specimen.—Cat. No. 8502, U.S.N.M., from *Albatross* station D5567, north of Tawi Tawi, 268 fathoms.

This is a very large species and with its peculiar aperture is of more than usual interest. The whole test is rhomboid, very flattened, the two sides seeming to differ, one being slightly convex, the other slightly concave, the concave side having the sutures more prominent than the other.

TEXTULARIA EXCAVATA, new species.

Plate 79, fig. 5.

Description.—Test rhomboid, composed of comparatively few chambers, early portion with the sides angled, later chambers broadly rounded at sides, chambers obliquely set, each forming an angle of 90° with the opposite chamber, distal portion of chamber thickened and tending to roll back, giving an excavated appearance to the test, outer face of last-formed chamber in adult broadly rounded and convex; aperture at the base of the inner margin of the chamber; wall composed of rather fine sand with a grayish-brown color due partly to the cement.

Length up to 2 mm. in adult specimens.

Type-specimen.—Cat. No. 8503, U.S.N.M., from *Albatross* station D5236, Pacific Ocean, east coast of Mindanao, 494 fathoms.

At this station the species was common. Its shape and peculiar sculptured test will distinguish it from other species.

TEXTULARIA SEMIALATA, new species.

Plate 80, figs. 6, 7.

Description.—Test much compressed, of numerous chambers, broader than high, the proximal outer angle of the adult chambers more or less projecting and extending backward, wall of fine sand, very smoothly finished; aperture at the inner margin of the chamber; color gray.

Length about 1 mm.

Type-specimen.—Cat. No. 8504, U.S.N.M., from *Albatross* station D5214, east of Masbate Island, 218 fathoms.

This species in some of its characters resembles *Bolivina beyrichii* Reuss. It is a true *Textularia*, however, and has many points in which it differs from that species. There is a considerable difference in the microspheric and megalospheric forms, both of which are here figured. The microspheric form is narrow at the beginning and

continues this form for some time, finally broadening out somewhat. The megalospheric form starts almost at once to develop a broad test of fewer chambers, but each has the same characteristic shape of the chambers.

BOLIVINA SCULPTURATA, new species.

Plate 80, fig. 2.

Description.—Test flattened, rhomboid, chambers nearly flat on the surface, the borders raised with a rounded rim, as are also the areas above the sutures, proximal end rounded, distal end tending to become uniserial; aperture on the terminal face of the last formed chamber, on the inner face of the previously formed ones; wall composed of finely granular material, yellowish-brown, raised borders of a whitish calcareous material.

Length about 1 mm.

Type-specimen.—Cat. No. 8505, U.S.N.M., from *Albatross* station D5236, Pacific Ocean, east coast of Mindanao, 494 fathoms.

The peculiar ornamentation of this species, with its terminal aperture as well as the materials of its construction, make this species a distinctive one.

CLAVULINA ROTUNDATA, new species.

Plate 79, fig. 3

Description.—Test of comparatively few chambers, tapering, apertural end broadly rounded, early portion triserial and conical followed by two or three chambers biserially arranged and the last formed chambers uniserial; wall thick, composed of fine sand grains with a dark reddish-brown cement; smooth; aperture terminal, large and rounded, depressed without a neck; color reddish-brown.

Length 2.5 - 3 mm.

Type-specimen.—Cat. No. 8506, U.S.N.M., from *Albatross* station D5512, off northern Mindanao, 445 fathoms.

It is not uncommon at this and other stations.

This species is much shorter than most other species of the genus, broadly rounded at the apertural end, the wall thick and resembling that found in *Hormosina* and some species of *Trochammina*, *Ammodiscus*, etc. The aperture, instead of having a neck, shows rather the lack of it, the actual opening into the last formed chamber being in a slight depression.

CLAVULINA PRIMÆVA, new species.

Plate 80, figs. 4, 5.

Description.—Test elongate, cylindrical, slender, composed of numerous chambers; early portion triserial, median portion biserial, terminal portion uniserial; chambers high; wall thick, light gray in

color, smooth, sutures slightly depressed; aperture small, with a slight neck, more marked in the young stages.

Length about 3 mm.

Type-specimen.—Cat. No. 8507, U.S.N.M., from *Albatross* station D5585, vicinity of Sibuko Bay, Borneo, 476 fathoms.

This species is peculiar in the retarded taking on of the typical uniserial character of chamber arrangement and in the length of time that the biserial condition is held. In this it is distinctly primitive, much more so than in any other known species. The early triserial condition, on the other hand, is not much longer held than in some other species of the genus. The figure of a young specimen shows the typical clavuline neck even while the biserial condition is still held.

GAUDRYINA ATTENUATA, new species.

Plate 80, fig. 3.

Description.—Test elongate, composed of numerous chambers, early portion triserial, triangular in cross section with sharp angles, biserial chambers numerous, nearly as high as broad, in later development each chamber running nearly or quite to the opposite side of the test; wall rough, composed of rough sand grains and sponge spicules roughly cemented, aperture at first textularian, becoming more nearly circular in the last formed chambers; color light gray.

Length about 3 mm.

Type-specimen.—Cat. No. 8508, U.S.N.M., from *Albatross* station D5259, off northwestern Panay, 312 fathoms.

This species differs from *G. filiformis* Berthelin in its sharply triangular basal portion and in its more loosely biserial form, as well as the form of the aperture. It differs from *G. pseudofiliformis* Cushman in the aperture, the very rough surface and more loosely biserial character. The apertural end tends to become attenuate but not to assume a clavuline character.

GAUDRYINA RCZUSTA, new species.

Plate 78, fig. 2.

Description.—Test large, stout, early portion sharply triangular, triserial, later chambers biserial, rounded; wall made up of fine sand grayish in color, with numerous black specks; surface somewhat rugose, sutures slightly depressed, sides of early portion somewhat concave; aperture textularian, in a rather deep reentrant of the inner border of the chamber.

Length 4 mm., breadth 2 mm.

Type-specimen.—Cat. No. 8509, U.S.N.M., from *Albatross* station D5612, Gulf of Tomini, Celebes, 750 fathoms.

This is a large species, very robustly built, the early portion concavely triangular, the later portion very much rounded. The specimen figured shows but a few of the biserial chambers.

VIRGULINA CORNUTA, new species.

Plate 80, fig. 1.

Description.—Test pointed at the initial end, broadly rounded at the apertural end, whole test curved, irregularly biserial, last formed chambers very tumid, aperture a comma-shaped opening with a surrounding raised portion; wall thin and translucent, smooth.

Length about 0.8 mm.

Type-specimen.—Cat. No. 8510, U.S.N.M., from *Albatross* station D5284, China Sea, near southern Luzon, 422 fathoms.

This species is peculiar in its hornlike shape, its very tumid last formed chambers and tapering curved early portion.

THURAMMINA PAPYRACEA, new species.

Plate 79, fig. 4.

Description.—Test spherical, wall extremely thin and delicate, composed of fine sand grains, sponge spicules and a brownish cement; apertures very small and inconspicuous.

Diameter 1.5 mm.

Type-specimen.—Cat. No. 8511, U.S.N.M., from *Albatross* station D5613, north of Celebes, 752 fathoms.

This is a large species with a paper thin wall and very inconspicuous apertures.

REOPHAX AGGLUTINATUS, new species.

Plate 79, fig. 6.

Description.—Test large and stout, composed of several chambers, nearly globular or slightly pyriform; wall composed almost entirely of agglutinated foraminiferal tests of *Globigerina* and *Pulvinulina* held together with a light grayish cement; aperture with a slightly protuberant neck.

Length about 6 mm.

Type-specimen.—Cat. No. 8512, U.S.N.M., from *Albatross* station D5377, vicinity of Marinduque Island, 400 fathoms.

This is a large species and peculiar in its agglutinated test made up almost entirely of other foraminiferal tests. In this respect it resembles *R. bilocularis* Flint but is a typical uniserial *Reophax*.

AMMOCHILOSTOMA ROTUNDATA, new species.

Plate 79, fig. 1.

Description.—Test nearly spherical or somewhat ovate, of few chambers, two only visible from the exterior, the last formed chamber covering all but a small part of the preceding one each time as added, chambers arranged in an irregular coil; wall fairly thick, of

fine sand grains with a grayish-brown cement; aperture narrow and elongate in adult chambers, but rounded in the early ones, near the middle of the terminal face of the last formed chamber, but removed from the border of the preceding chamber; color light brown.

Diameter about 1 mm. or over.

Type-specimen.—Cat. No. 8513, U.S.N.M., from *Albatross* station D5613, north of Celebes, 752 fathoms.

Usually in the specimens broken back there are four chambers, sometimes five. The increase in size is very rapid, after the second chamber. In adult specimens the last formed chamber is nearly spherical but the preceding chamber appears as a slight protuberance, often causing an ovate shape. The species was found in considerable numbers at this and other stations.

EXPLANATION OF PLATES.

PLATE 78.

- Fig. 1. *Textularia vertebralis*. $\times 25$. *a*, front view; *b*, apertural view.
 2. *Gaudryina robusta*. $\times 18$. *a*, view from angle; *b*, apertural view; *c*, view from flattened side.

PLATE 79.

- Fig. 1. *Ammochilostoma rotundata*. $\times 33$. *a*, apertural view; *b*, front view.
 2. *Textularia immensa*. $\times 10$. *a*, apertural view, showing the several apertural openings; *b*, front view.
 3. *Clavulina rotundata*. $\times 25$. *a*, apertural view; *b*, front view.
 4. *Thuramina papyracea*. $\times 25$.
 5. *Textularia excavata*. $\times 20$. *a*, apertural view; *b*, front view.
 6. *Reophax agglutinatus*. $\times 10$. *a*, apertural view; *b*, front view.

PLATE 80.

- Fig. 1. *Virgulina cornuta*. $\times 50$. *a*, front view; *b*, rear view; *c*, apertural view; *d*, side view.
 2. *Bolivina sculpturata*. $\times 40$. *a*, apertural view; *b*, front view.
 3. *Gaudryina attenuata*. $\times 25$. *a*, front view; *b*, apertural view; *c*, apertural view of an earlier portion of the uniserial stage with the aperture asymmetrical; *d*, apertural view of the biserial stage.
 4. *Clavulina primæva*. $\times 25$. Young specimen showing biserial stage with the aperture at the inner margin of the chamber, but tubular.
 5. *Clavulina primæva*. $\times 25$. *a*, apertural view; *b*, front view.
 6. *Textularia semialata*. $\times 50$. *a*, apertural view; *b*, front view. Microspheric specimen.
 7. *Textularia semialata*. $\times 50$. Megalospheric specimen.